

After the Florida Net Ban: The Impacts on Commercial Fishing Families

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In November 1994, Florida voters approved a constitutional amendment that outlawed commercial entanglement nets of more than 500 square feet in state waters. The "net ban" affected an estimated 1500 fishers and their families. This article reviews some of the family impacts of the net ban, based on data collected from a group of commercial fishing families who participated in a study of family stress and coping before the net ban and agreed to be reinterviewed after this significant event. The results focus on the stress and coping processes families used to adjust to the net ban and the gender differences in the stress process and stress outcomes. Findings indicate that both husbands and wives experience mental health impacts of changes in the industry and that these outcomes manifest in different ways by gender. The article concludes with a discussion of the implications for policies, programs, and services offered to those affected by changes in natural resource regulations.

Keywords communities, families, fishing, gender, natural resources, nets, net ban, regulations, mental health, stress

In November 1994, Florida voters approved a constitutional amendment that outlawed the use of commercial entanglement nets of more than 500 square feet in state waters. The vote on the so-called "net ban" was the culmination of a 2-year, multi-million-dollar media campaign launched by a coalition of recreational fishing groups and conservationists against Florida's commercial fisheries. Dissatisfied with the perceived inaction of the Florida legislature and state agencies charged with

Received 29 January 2001; accepted 1 November 2001.

Paper presented at the Annual Meeting of the Rural Sociological Society, Portland, OR, August 1998. This article is Florida Agricultural Experiment Station Journal Series number 99-01.

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regulating commercial fisheries, these groups by-passed the normal state policy and regulatory processes and called for a public referendum that would put the issue directly before voters (Duff and Harrison 1997, 404).

Most of the voters knew little about gill nets or their impacts on the environment and the information presented in pamphlets and advertisements was often insufficient and misleading (Duff and Harrison 1997). Proponents of the amendment cast the net ban as an environmental issue, arguing that the nets indiscriminately killed endangered species and depleted fin fish stocks (Duff and Harrison 1997). Heart-breaking images of birds, dolphins, and sea turtles tangled in fishing nets led the public to believe that commercial fishing was not only degrading fisheries stocks but destroying Florida's marine environment (Jones 1995).

Sources associated with the net ban campaign suggested that some fisheries stocks were in serious decline, that by-catch of nontargeted fish produced significant waste, and that other sea life was endangered by gill nets. However, many scientists disagreed, noting that there were few problems with overfishing and little evidence of a downward trend in the stocks of species studied (Duff and Harrison 1997). Taking the available scientific information into account, the evidence was "inconclusive as to whether gillnets cause irreparable harm to saltwater finfish stocks" (Duff and Harrison 1997, 397). According to some observers, the issue had not been adequately evaluated through the appropriate fishery management agencies to justify a complete ban on inshore gill net fishing (Duff and Harrison 1997). The use of a public referendum to influence natural resource policy by circumventing the agencies that manage the state's marine resources was unprecedented. In effect, through a political process, the net ban amendment permanently altered the allocation of marine fisheries resources among commercial and recreational user groups (Adams 1994).

The net ban was actually a social issue, the culmination of years of bitter political disputes between recreational and commercial fishers and the regulatory body, the Florida Marine Fisheries Commission (FMFC). These disputes were over the regulation and allocation of the state's marine resources. Each group had its own interests in controlling access to marine resources; the net ban was really a question of "Who gets the fish?" (Jones 1995). Ultimately, recreational fishing groups, who had a strong financial base and public relations machine, succeeded in getting the referendum on the ballot. The net ban passed and went into effect 1 July 1995.

An unanticipated problem with the net ban referendum has been the confusion over the implementation and enforcement of the law. Net fishers and enforcement officials disagreed over whether all types of nets are subject to the ban and what portions of the nets are included in the calculation of the 500 square feet. Net fishers have constantly tried to adapt their gear to meet the letter of the law, but often their efforts land them in court, where in some cases there still has been no resolution. Some net fishers continue using gear that has not been legally approved or disapproved, and this is a constant source of stress and anger for those who use such gear. Those who have switched to other gear are also angered and confused about their legal fishing gear options.

Although the possible biological and economic impacts of the net ban were widely discussed, the potential social impacts were seldom brought to the public's attention. Newspaper articles presented firsthand accounts by fishermen about how the net ban would change their lives, but virtually no scientifically collected information was put forth for public consumption or debate. This is despite the fact that the net ban affected an estimated 1500 fishers and their families in coastal communities throughout the state.

The social implications of the net ban were pervasive. The net ban had the potential to damage families by eliminating their primary source of income, their family business, and a central part of their identity. Furthermore, the net ban had the potential to disrupt entire communities that were dependent on commercial seafood production as a significant component of their economic base.

In this article we present the results of a study of the family impacts of the net ban. This article is based on data collected from a group of commercial fishing families who had participated in a study of family stress and coping prior to the net ban (Time 1) and agreed to be reinterviewed after the net ban in 1997–1998 (Time 2). With data from the same families at two points in time, we were able to compare family functioning before and after the net ban.

In this article we report our answers to two research questions:

- What were the stress and coping processes families used to adjust to the net ban?
- What were the gender differences in the stress process and stress outcomes?

Background on Inshore Net Fishing in Florida

In the inshore net fishing segment of the commercial seafood industry, fishing operations and family life are closely intertwined. Indeed, commercial seafood production is a way of life, where families' daily lives and identities revolve around fishing. In many of these families, fishing is "in the blood." These second-, third-, and fourth-generation fishermen typically work all of their lives in seafood production, often do not complete high school, and are not trained for another occupation. Young men often crew with their fathers to learn the business. By the time they are teenagers they may have their own boats and may begin fishing for a living before they are 20. As a number of scholars studying various North American fisheries have noted, there is much more to fishing than the money; fishers derive considerable nonmonetary rewards from their work (Binkley 1990; Gatewood and McCay 1990; Pollnac and Poggie 1988).

Fishermen have historically been the family's primary wage earners and their earnings have provided the major source of household income. However, as research on small boat fishing worldwide has indicated, women have always played an important role in seafood production (Nadel-Klein and Davis 1988). Husbands and wives have distinct but complementary and coordinated roles (Binkley 2000). Men take the responsibility for the sea-based work and women for land-based activities such as financial management and the day-to-day operations of the business (Thiessen et al. 1992; Davis 1986; Thompson 1985). Changes in the industry and its regulation affect not only the producer—the fisherman himself—but also the family members who are supporting his work at sea.

In addition, a fisherman's wife's work may also include the job of worrying. Davis (1983) first introduced this concept of "woman as worrier" and proposed that it is part of the role and duty of a fisherman's wife to worry. She argued that worrying is a wife's way of saying, "I'm a good wife; I'm concerned about my husband and I, like him, am deeply tied into the fishing complex and am indispensable to his ability to fish successfully" (141).

In Florida, the threats to commercial fishermen include not only the physical dangers of being at sea, but continual regulatory changes that make it difficult for fishermen to be in compliance with the law, reduced income, and antifishing sentiments among the general public. In this context, wives may be the emotional anchor

for their families and buffer the negative impacts of these social and economic changes (Smith and Jepson 1996).

Stress and Natural Resource Dependency

Decades of research on individual and family stress has shown that stress negatively impacts mental health (NMHA 1988; Wagenfeld 1990). Alcohol and drug abuse, domestic violence, neurosis, depression, anxiety, and anger, hostility, and aggression are frequently cited as some of the more common psychological impacts of stressors (Belyea and Lobao 1990; Pearlin 1989). Studies of stress among those employed in the natural resource-dependent occupations of farming, timber, and fishing are relevant here.

Stress in Farming, Logging, and Fishing Communities

During the farm crisis, social scientists documented that Midwestern farmers were under great pressure. Declines in income and in available business options had major impacts on individual and family health such as incidents of depression, poor health, alcohol and drug abuse, domestic violence, and decreases in social well-being (Sundet and Mermelstein 1987; see also Armstrong and Schulman 1990; Belyea and Lobao 1990; Heffernan and Heffernan 1986; Norem and Blundall 1988; Walker and Walker 1988).

Studies of the consequences of job loss in the wood products industry showed similar results. Common responses to unemployment included depression, child or spouse abuse, and alcohol and drug use. Producers felt blamed for environmental destruction and betrayed by the government. This was despite the fact that they upheld traditional American values of family, community loyalty, and hard work. They felt that they lost a "way of life," and many individuals suffered from a loss of self-esteem. This accumulation of stress impaired individuals' capacity to make decisions about retraining, moving, or changing occupations (Lee et al. 1991, cited in U.S. Department of Agriculture 1994; Rural Sociological Society 1990).

Research on job satisfaction among commercial fishers in New England (Pollnac and Poggie 1988) indicated that management decisions about various aspects of fishing can have an enormous impact on the structure of the fishers' work. Corresponding changes in job satisfaction have been related to a number of negative family and social impacts such as family violence, absenteeism, and lower worker productivity (Pollnac and Poggie 1988). Binkley's (2000) studies of family coping with the North Atlantic fisheries' crisis in Nova Scotia indicated that financial well-being was an urgent problem. Families pursued various coping strategies, such as increasing wives' employment outside the home. For women, assuming a breadwinner role was associated with increased stress. Changes in fishing practices (e.g., fishing further away from home ports in unfamiliar waters), as well as declines in wages and loss of work, ate away at men's self-esteem and intensified their anxiety.

Davis's (2000) study of the impacts of Newfoundland's fishery crisis showed escalating levels of marital conflict associated with shifts in the gendered division of labor and gender roles. Declines in fishing were traumatic for men, whose masculine identity and self-esteem were closely tied to seamanship and ability to handle a boat, and whose lives revolved around various fishing-related activities and spaces. As men lost their occupation, women, too, were deprived of their unique and powerful expressive role as supporters of their fishing husbands and protectors of the fishing community and culture. Tragically, interpersonal violence escalated, and

a "homeless, helpless sense of demoralization" permeated this once vibrant and hard-working community (Davis 2000, 350). Some women viewed now-unemployed men as an economic liability; single-mother households became more common as women began "unhusbanding their resources" (Davis 2000, 350).

Recent research on the family impacts of the collapse of the New England groundfish industry reported that families experienced chronic financial difficulties and psychosocial stress (Mederer 1995). Mederer observed that economic stress produced a role reorganization within the household whereby women increased their involvement in breadwinning (Mederer 1999). As families suffered through changes in their traditional way of life, each gender responded differently: Men mourned the change in their identity, and women worried about money. Mederer (1995; 1999) also found that certain individual and family characteristics were important to family coping and resiliency, including self-esteem, mastery, family cohesion, financial cutbacks, job changes, and financial planning. Flexibility in gender roles appears to be particularly important for resiliency, as is the support wives receive from their friends. However, additional stress is produced when there is no clear opportunity for stable, gainful employment for the displaced fisherman (Mederer 1999).

Ethnographic research concurred that such dramatic changes in access to the resource that serves as a primary income source can have negative outcomes. In Florida in the 1980s, anticipated changes in red drum regulations had devastating impacts on men's self-esteem and disrupted communication between husbands and wives, particularly regarding future careers in fishing (Lampl 1986).

Stress and Coping in Florida's Commercial Fishing Families

Our previous research, conducted between 1991 and 1993 (Smith 1995), studied the impacts of changes in fisheries regulations on commercial fishing families that were involved in inshore gill net production. In the years immediately prior to that research, gill netters were facing an increasing number of regulations on gear, the size of the catch, and hours on the water.

That research indicated that families were very concerned about financial strains that had come about due to changes in fisheries regulations. As total income from fishing decreased, families had greater difficulty paying bills. Most families were broke at the end of the month, and more than one-third had reduced or eliminated expenses such as for health care, health insurance, and food.

One coping strategy that families used was for women to enter the labor force; indeed, we found that women's employment reduced financial strains. However, women's employment also increased family strains and decreased marital satisfaction. As women shifted their efforts to outside employment, they probably had less energy and time to provide emotional support to their husbands, may have asked more of their husbands around the home, and found that there was less time for family activities.

When we examined the paths to depression for men and women, as expected women scored higher on measures of depression. However, different paths to depression emerged for men and women. Women, but not men, were directly affected by industry changes. We speculated that women played pivotal roles in managing household and business finances and in providing emotional support for their husbands. In many ways, women seemed to carry the burden of industry changes for their families.

As the net ban loomed closer and threats of violence were reported, we came to believe that we had not tapped the ways in which men manifest stress and therefore had not presented a complete picture of stress in these families. Consistent with other research, we had found women were more prone to depression, and we anticipated that men would be more likely to manifest their stress in anger, alcohol abuse, and anxiety. Post net ban interviews confirmed that fishers felt antagonized by the increasing presence of recreational fishers, who were the primary supporters of the referendum. In addition, fishers perceived that the great majority of Floridians were misled about the environmental impacts of fishing. They felt that they had been wrongly characterized by the net ban proponents and believed that the majority of Floridians agreed with the recreational fishers. To better capture how men might have handled the net ban, we added measures of anger, alcohol abuse, and anxiety in the post net ban study.

Theoretical Perspectives

The existing research on fishing families as well as farmers and loggers suggests that commercial fishing families are likely to be at risk of various stress outcomes. Yet we also know that stress is a result of a combination of risk factors (stressors) and of protective factors that enable individuals to cope and adapt, thereby reducing the potential negative impacts of stressors. Risk and protective factors often vary by individual characteristics such as age or gender. According to this conceptualization, stress is a subjective experience of individuals, perceived and defined by the individual.

Methods

In this section we review the methods for the pre net ban study at Time 1 (1993) as well as the methods used at Time 2 (1998). Here we also provide information about the analyses that determined that the sample at Time 2 was not significantly different from the original study group on social and demographic characteristics.

Study Groups

Because this was a study of fishing families, the sample was composed of commercial fishers who net fished some time during the year and their spouses. Couples had at least one child under 18 living at home. The researchers identified potential study participants through meetings held with local chapters of the Organized Fisherman of Florida (O.F.F.) and listings of resident commercial fishers provided by these chapters. The researchers then contacted 128 potential study participants by telephone and explained the purpose of the study. Ninety-five (95) participants in 10 coastal communities agreed to interviewed, for a response rate of 75%.

In April 1997, the investigators undertook every possible effort to locate the fishing families who had participated in the 1993 study. Of the original 95 families, 44 participated in the Time 2 research. Others did not for the following reasons: 14 families were removed due to divorce and one family due to death; 4 families could not be located and 8 had moved out of state; 24 refused to participate or could not be scheduled. There was a 65% completion rate (completions/eligibles).

Although we would have liked to have interviewed the individuals that had divorced, we were concerned that the interview would place an undue psychological burden on our subjects. This is because the survey asked specific questions about

households and household conflict. Additionally, the initial survey was written specifically for two-parent families with children. Another complication of including divorced subjects is that many had left the study community and, in many cases, the state. Although we were often able to successfully locate subjects, we did not have sufficient funding to interview divorced individuals, or even intact couples who had left the state.

The researchers conducted focus group interviews and personal phone interviews with fishing industry experts to better understand the difficulties fishing families were experiencing after the time of the net ban, the ways they were coping, the types of services they were utilizing, the job options they were pursuing, the types of educational programs and services offered, and families' level of interest in these programs. Investigators used this information in the development of the questionnaire. The survey instrument was based on the Time 1 questionnaire with additional items to tap the impacts of the net ban.

As in Time 1, in-depth face-to-face interviews were conducted in families' homes. One female and one male research assistant conducted each interview. The interviewers administered the survey by reading the questionnaire items and writing down the participants' responses. Answers to open-ended questions were tape-recorded with the participants' permission. Couples answered some questions together and then went to separate rooms to answer additional questions pertaining to their individual experiences and their relationships with each other. These sensitive questions, pertaining for example to marital satisfaction, were asked by the same-sex interviewer.

Respondents lived in 10 different coastal communities, 8 located on the Gulf of Mexico and 2 located on the Atlantic Ocean. These 10 coastal communities were identified by key informants familiar with Florida's fishing industry as being the most commercial fishing dependent in the state. Therefore, the study panel is not geographically representative of the state and the information presented here can only be generalized to the study group. Despite this limitation, the following information is the only existing study of the net ban impacts on fishing families.

The quantitative data were coded and entered into a database. The research hypotheses were tested using the appropriate descriptive or multivariate statistic. The multivariate analysis is described in more detail later.

Study-Group Reliability

The 1997–1998 study participants are essentially a subsample of the 1993 study group. It is possible that the study participants in 1997–1998 differ from the group that did not participate in 1997–1998. To test for this possibility, a series of *t*-tests were conducted for important social and demographic characteristics. The 1997–1998 study sample was very similar to the 1993 study sample for the variables of husband's age, wife's age, husband's education, wife's education, number of years in the community, number of years as a fisher, percentage of income from fishing, and years married. Only one variable produced a statistically significant difference, the total number of family members. Families in the initial 1993 sample were slightly larger than those families who participated in both studies (4.2 and 3.9 family members, respectively). Further analysis revealed that household size was reduced as a result of a normative process of older children leaving the home, as they would in a nonfishing household. The investigators concluded that the 1997–1998 subsample is very much like the 1993 study group.

Results

Social and Demographic Characteristics of the Time 2 Study Group

The Time 2 study group had a long personal and family history of involvement in commercial fishing. On average, they were middle-aged men and women (the average age for the father was 39, the mother's average age was 36). They had lived most of their lives in their home communities—on average, the men had lived in their communities for 30 years, whereas women had, on average, lived in their communities for 21 years.

They had spent most of their adult lives working as commercial fishers and had continued in this occupation after the net ban by changing their gear for fin fish or by altering their operations to fish for other species. Of the 44 families interviewed in 1997–1998, 34 (77%) were still actively fishing. Of these 34 families, 24 (69%) were fishing full-time. The men in the study who have continued to fish had an average of 25 years experience, which indicates that most began fishing as teenagers. Men in the study group had, on average, 11.6 years of education, while women had an average of 12.8 years of formal education.

As these families had indicated at Time 1, they placed a high value on hard work and economic self-sufficiency. These values are reflected in the labor force patterns of the study group at Time 2. All of the men were employed ($n=44$). In addition to their primary occupation (fishing or some other type of work if no longer fishing), 12 (35%) held a second job (6 were full-time and 6 were part-time). Of those holding second jobs, 10 out of the 12 (83%) said the need for a second job was a result of the net ban. Of the 10 men in the study who were no longer fishing, 8 indicated that the net ban was the reason for their job change.

Regarding the women, 31 were working (70%), of whom 22 were working full-time and 9 were part-time. Of these working women, 16 (52%) indicated that their employment was a direct result of the net ban. Of those 31 women who had a primary job, 10 (32%) held additional jobs to help make ends meet (9 of 10 were part-time). Of these 10 women, 5 (50%) indicated that their second job was a result of the net ban. Household income was assessed with the following categories: 1, < \$9,999; 2, \$10,000–\$14,999; 3, \$15,000–\$19,999; 4, \$20,000–\$24,999; 5, \$25,000–\$29,999; 6, \$30,000–\$39,999; 7, \$40,000–\$49,999; 8, \$50,000–\$59,999; 9, \$60,000–\$69,999; 10, \$70,000–\$79,999; 11, \$80,000–\$89,999; 12, > \$90,000. The modal category for household income (including all men's and women's employment) was \$30,000 to \$39,999.

The average number of household members for the study families was 4, indicating most couples had two children. The oldest child's average age was 18, and the second child's average age was 13. Some families were significantly larger than two children (the range was 1 to 5 children).

The Dependent Variables: Measures of Stress Impacts

Perceived Stress

The perceived stress index consisted of seven variables: unable to control important things, nervous and stressed, things are going their way, unable to cope, on top of things, angered, and difficulties were piling up. Participants were given the response categories (1) never, (2) almost never, (3) sometimes, (4) fairly often, and (5) often. They were asked how often in the last week they had experienced these feelings.

Factor analysis produced a single factor with an eigenvalue of 3.31, which explained 47% of the variation within the model. Alpha reliability for this index was .81. Each respondent's individual perceived stress index score was figured as the mean of the responses to the seven questions. Then the mean for each of the respondents' perceived stress index score was taken. The mean of all the respondents' scores was 2.7 and the standard deviation was .52.

Depression

Participants were presented with seven items that are considered standard indicators of depression: lack of enthusiasm, poor appetite, loneliness, boredom, loss of sexual interest, low in energy, and hopelessness about the future. Then they were asked to indicate how often during the past week they had experienced these feelings: (1) never, (2) somewhat often, or (3) very often.

Factor analysis produced a single factor with an eigenvalue of 3.28, which explained 47% of the variation within the model. Alpha reliability for this index was .81. Each participant's individual depression index score was figured as the mean of the responses to the seven questions. Then the mean for each of the participants' depression index scores was calculated. The mean of all the respondents' scores was 1.4 and the standard deviation was .41.

Anxiety

The anxiety index consisted of seven items: bothered by an upset stomach, bothered by nightmares, troubled by cold sweats, bothered by all sorts of ailments, bothered by shortness of breath, bothered by heart beating hard, and ill health affected activities. Participants were asked to indicate how often during the past week they had these feelings: (1) never, (2) seldom, (3) often, or (4) frequently.

Factor analysis produced a single factor with an eigenvalue of 3.71, which explained 53% of the variation within the model. Alpha reliability for this index was .84. Each participant's individual anxiety index score was figured as the mean of the responses to the seven questions. Then the mean for each participant's anxiety index scores was calculated. The mean of all the respondents' scores for the anxiety index was 1.7 and the standard deviation was .61.

Anger

The anger index consisted of seven variables: quick tempered, fiery tempered, hotheaded, angered by others, likely to fly off the handle, likely to say nasty things, and frustrated, feel liking hitting someone. Participants were asked to indicate how often they had these feelings: (1) almost never, (2) sometimes, (3) often, or (4) almost always.

Factor analysis produced a single factor with an eigenvalue of 3.94, which explained 56% of the variation within the model. Alpha reliability for this index was .87. Each respondent's individual anger index score was figured as the mean of the responses to the seven questions. Then the mean of all the respondents' anger index scores was taken. The mean of all the respondents' scores was 1.6 and the standard deviation was .50.

Independent Variables

Family Stress

The family stress index consisted of four variables. Respondents were asked whether in the past year: a family member had emotional problems, a family member

had a dependency on alcohol, the family experienced physical or psychological violence, and the couple had difficult sex relations. Responses were coded as 0 "no" and 1 "yes."

Factor analysis produced a single factor with an eigenvalue of 1.85, which explained 46% of the variation within the model. Alpha reliability for this index was .61. Each respondent's individual family stress index score was figured as the mean of the responses to the four questions. Then the mean of all the respondents' family stress index scores was taken. The mean of all the respondents' scores was .19 and the standard deviation was .25.

Industry Change

The industry change index consisted of four questions that assessed the degree of change in the fishing industry. These questions asked about the change in the following: pounds of all species landed, total income from fishing, regions where you fish, and total time fishing each year. Response categories were as follows: (1) major decrease, (2) some decrease, (3) no change, (4) some increase, and (5) major increase.

Factor analysis produced a single factor with an eigenvalue of 1.97, which explained 49% of the variation within the model. Alpha reliability for this index was .75. Each respondent's industry change index score was figured as the mean of the responses to the four questions. Then the mean of all the respondents' industry change index scores was taken. The mean of all the respondents' scores was 2.05 and the standard deviation was .86.

Self-Esteem

The self-esteem index consisted of eight variables. Participants were asked to indicate how strongly they agreed or disagreed with the following statements: (1) I feel I have a number of good qualities, (2) I am not proud of much, (3) I take a positive attitude, (4) I am satisfied with myself, (5) I feel that I am a failure, (6) I wish I had more self-respect, (7) I feel useless at times, and (8) I think I am no good at all. Participants rated their level of agreement on a 4-point scale: (1) strongly agree, (2) agree, (3) disagree, and (4) strongly disagree.

Factor analysis produced a single factor with an eigenvalue of 4.48, which explained 56% of the variation within the model. Alpha reliability for this index was .89. Each respondent's individual self-esteem index score was figured as the mean of the responses to the eight questions. Then the mean of all the respondents' self-esteem index scores was taken. The mean of all the respondents' scores was 3.2 and the standard deviation was .43.

Mastery

The mastery index consisted of seven variables. Participants were asked to indicate how strongly they agree or disagree with the following statements: (1) there is no way I can solve some of the problems I have, (2) sometimes I feel that I am being pushed around in life, (3) I have little control, (4) I can do just about anything, (5) I often feel helpless, (6) what happens in the future is up to me, and (7) there is little I can do to change the important things in my life. Participants were given four response categories: (1) strongly agree, (2) agree, (3) disagree, and (4) strongly disagree.

Factor analysis produced a single factor with an eigenvalue of 3.13, which explained 52% of the variation within the model. Alpha reliability for this index was .82. Each respondent's individual mastery index score was figured as the mean of

the responses to the seven questions. Then the mean of all the respondents' mastery index scores was taken. The mean of all the respondents' scores was 2.7 and the standard deviation was .48.

New Job

Husbands and wives were asked if they had any employment other than fishing and for how long they have held those jobs. Respondents were also asked if these jobs were a result of the net ban. The new job variable was calculated by creating a zero-one indicator variable. If respondents had indicated they had at least one job, for less than 3 years, and, indicated the new job was a result of the net ban, the respondent was assigned a score of 1. One-third of all respondents (29) indicated they held other jobs as a result of the net ban.

Religiosity

The last variable was a single item dealing with religiosity (see Table 2). The question simply asked: "How frequently do you attend religious services?" Responses included: (1) never, (2) several times a year, (3) once a month, (4) few times a month, (5) once a week, and (6) several times weekly. The mean for this question was 3.43 and the standard deviation was 1.92.

Multivariate Analysis

For the multivariate analysis, four models (for both women and men) were run for each of the four dependent variables (the depression, anxiety, anger, and stress indices; Table 1). Because of the relatively small size of the study group, the multivariate analysis was conducted through a series of regression analyses to arrive at a reduced model.¹ For example, for the depression index for women, the socio-demographic factors of age, income, and education were utilized in a regression framework (Table 2). Age was statistically significant, and was included in the final depression model for women. The second regression for the depression index

TABLE 1 Descriptive Statistics for Variables in the Models

Variables	<i>n</i>	Mean	Standard deviation	Minimum	Maximum
Sociodemographic factors					
Age	88	43.0	9.5	25.0	65.0
Income	86	6.5	2.8	1.0	12.0
Education	86	11.7	1.8	8.0	21.0
Risk factors					
Perceived stress	87	2.8	.6	1.3	4.4
Family stress	86	.2	.3	0	1.0
Industry change	88	2.0	.9	1.0	4.7
Protective factors					
New job	88	.5	.6	0	2.0
Self-esteem	87	3.2	.4	1.4	4.0
Mastery	87	2.7	.5	1.0	4.0
Religiosity	87	3.4	1.9	1.0	6.0

TABLE 2 Multivariate Models of Stress Outcomes With Demographic, Risk, and Protective Factors (Females)

Variables	Depression model			Anxiety model			Anger model			Stress model		
	B	b	SE of b	B	b	SE of b	B	b	SE of b	B	b	SE of b
Sociodemographic factors												
Age	.388	.018 ^a	.007	.386	.026*	.010	.141	.035	.044	.298	.017	.009
Income	-.193	-.029	.023	-.091	-.020	.035	-.239	-.036	.026	-.144	-.027	.031
Education	-.169	-.041	.039	-.195	-.070	.059	.141	.035	.044	-.112	-.034	.052
Constant		1.419 ^a	.448		1.78 ^a	.671		.882	.497		2.728 ^a	.591
Adjusted R ²	.15			.10			.05			.05		
Risk factors												
Perceived stress	.582	.451 ^a	.103	.249	.284	.223	.395	.345*	.156			
Family stress	.166	.243	.196	.087	.188	.421	.147	.237	.287	.628	1.192 ^a	.231
Industry change	.228	.107 ^a	.048	.103	.071	.104	.192	.010	.070	.077	.047	.071
Constant		.161	.272		.747	.585		.245	.419		2.403 ^a	.165
Adjusted R ²	.55			.05			.26			.38		
Protective factors												
New job	-.181	-.116	.078	-.139	-.113	.137	-.210	-.080	.089	.071	.058	.090
Self-esteem	-.453	-.197	.139	-.433	-.532 ^a	.243	.126	-.113	.158	.176	.186	.160
Mastery	-.233	-.389 ^a	.141	.010	.013	.249	-.391	-.355 ^a	.161	-.831	-.894 ^a	.164
Religiosity	.071	.016	.028	.005	.021	.049	-.163	-.038	.052	-.066	-.019	.032
Constant		3.067*	.336		3.39 ^a	.591		2.965 ^a	.391		4.690 ^a	.388
Adjusted R ²	.39			.11			.28			.48		

^aSignificant at $p < .05$.

included the risk factors of perceived stress, family stress, and industry change. Both the perceived stress and the industry change variables were statistically significant (Table 2) and, as a result, were included in the final depression index model. The protective factors of getting a new job, the self-esteem and mastery indices, and religiosity were included in the last regression model. Only self-esteem was statistically significant. As a result of this process, the women's model of regression included age, perceived stress, industry change, and self-esteem. This process continued systematically through the four dependent variables for women and men (Tables 2 and 3).

Analysis of the Final Models for Women's and Men's Stress Outcomes

The Depression Models

The men's and women's models for the depression index have some similarities. Perceived stress and self esteem were very important factors for both men and women (Table 4). For both men and women, as stress increased, so did the depression indicator. In addition, increased reporting of self esteem was associated with decreased depression scores. For men, as education increased, depression scores decreased. The age variable was not statistically significant for women, although in the earlier sociodemographic analysis it did reach statistical significance (Table 2). The industry change variable for women was statistically significant. As the amount of perceived change in the industry increased for women, so did depression scores. The adjusted R^2 for the men's model was .43 and was .62 for the women's model (Table 4).

The substantive difference between these models is the direct relationship of perceived industry change on women's depression scores. This suggests that for this stress outcome, women are more directly impacted by industry change than men, even though men are the ones who are directly engaged in the industry.

The Anxiety Models

There were no similarities in the models of anxiety for men and women model (Table 4). For women, only the self-esteem variable was statistically significant. As the reporting of the self-esteem indicator increased, anxiety scores decreased. The model for women had an adjusted R^2 of .17. For men, perceived stress and family stress increased reported anxiety scores. Having a job outside of the fishing industry and higher reported self esteem, however, served to reduce anxiety scores. The adjusted R^2 for this model is .39.

In the previous depression model, one could reasonably interpret the industry change impact on women as their response to the negative repercussions of problems in the industry on family members—including the husband. This is an impact seen in other research. In the anxiety model we see a similar response for men: Men react to family stressors by increasing their reports of anxiety. This response is not seen among the women.

The Anger Models

The men's and women's models for anger were identical (Table 5). Perceived stress increased the levels of reported anger. However, stress was more influential in the men's model, as seen by the larger standardized regression coefficient. For both men and women, as the mastery index increased reported anger scores decreased. Here, mastery is a more important predictor for women. The adjusted R^2 for men is .32 and is .28 for women.

TABLE 3 Multivariate Models of Stress Outcomes With Demographic, Risk, and Protective Factors (Males)

Variables	Depression model			Anxiety model			Anger model			Stress model		
	B	b	SE of b	B	b	SE of b	B	b	SE of b	B	b	SE of b
Sociodemographic factors												
Age	.069	.002	.006	.083	.005	.010	-.065	-.003	.009	-.121	-.007	.008
Income	-.011	-.002	.023	.008	.002	.040	.062	.012	.035	.052	.009	.032
Education	-.429	-.097 ^a	.037	-.191	-.065	.061	-.025	-.057	.081	-.363	-.073 ^a	.035
Constant		2.51 ^a	.44		2.21 ^a	.73		2.021 ^a	.670		3.66 ^a	.477
Adjusted R ²	.11			.00			.00			.060		
Risk factors												
Perceived stress	.580	.411 ^a	.100	.428	.506 ^a	.155	.501	.523 ^a	.142			
Family stress	.078	.136	.228	.329	.888 ^a	.354	.179	.432	.330	.290	.575 ^a	.149
Industry change	.097	.049	.065	.051	.041	.101	.008	.005	.092	.032	.021	.103
Constant		.141	.470		.226	.460		.222	.423		2.58 ^a	.231
Adjusted R ²	.32			.32			.27			.02		
Protective factors												
New job	-.097	-.065	.094	-.274	-.283 ^a	.136	-.128	-.117	.129	.015	.014	.120
Self-esteem	-.409	-.441	.191	-.473	-.792 ^a	.294	.178	.262	.263	-.215	.305	.246
Mastery	-.157	-.131 ^a	.149	.037	.047	.229	-.570	-.641 ^a	.205	-.408	-.445 ^a	.192
Religiosity	.083	.017	.027	-.035	-.011	.191	-.189	-.052	.037	-.163	-.044	.035
Constant		3.16 ^a	.47		4.190	.736		2.793 ^a	.659		4.952 ^a	.615
Adjusted R ²	.25			.27			.26			.28		

^aSignificant at $p < .05$.

TABLE 4 Reduced Multivariate Models of Stress Outcomes With Demographic, Risk, and Protective Factors

Variables	Men's depression model			Women's depression model			Men's anxiety model			Women's anxiety model		
	B	b	SE of b	B	b	SE of b	B	b	SE of b	B	b	SE of b
Sociodemographic factors												
Age				.101	.008	.010				.206	.014	.010
Income												
Education	-.193	-.043 ^a	.014									
Risk factors												
Perceived stress	.317	.242 ^a	.112	.599	.479 ^a	.082	.401	.473 ^a	.148			
Family stress							.279	.751 ^a	.344			
Industry change				.193	.095 ^a	.044						
Protective factors												
New job							-.256	-.264 ^a	.129			
Self-esteem							-.260	-.435 ^a	.212	-.328	-.404 ^a	.189
Mastery	-.369	-.403 ^a	.147	-.224	-.190 ^a	.093						
Religiosity												
Constant		2.606	.808		.45 ^a	.20		1.547	.799		2.930 ^a	.839
Adjusted R ²	.43			.62			.39			.17		

^aSignificant at $p < .05$.

TABLE 5 Reduced Multivariate Models of Stress Outcomes With Demographic, Risk, and Protective Factors

Variables	Men's anger model			Women's anger model			Men's stress model			Women's stress model		
	B	b	SE of b	B	b	SE of b	B	b	SE of b	B	b	SE of b
Sociodemographic factors												
Age												
Income							-.267	-.054 ^a	.025			
Education												
Risk factors												
Perceived stress	.375	.392 ^a	.162	.191	.161	.154	.405	.177	.283	.355	.674 ^a	.227
Family stress												
Industry change												
Protective factors												
New job												
Self-esteem												
Mastery	-.299	-.336 ^a	.175	-.411	-.373 ^a	.165	-.522	-.569 ^a	.136	-.516	-.542	.126
Religiosity												
Constant		1.547 ^a	.700		2.02 ^a	.81		4.800 ^a	.441		4.11 ^a	.381
Adjusted R ²	.32			.28			.35			.57		

^aSignificant at $p < .05$.

The Perceived Stress Models

The models for perceived stress for men and women are somewhat similar (Table 5). Mastery is an important variable in both models, and is of roughly equal strength. However, men's educational level is also statistically significant. As men's education levels increase, reported stress declines. For women, family stress directly impacts the levels of perceived stress. The adjusted R^2 for the men's stress model is .35 and is .57 for women's stress. Here we see that family stress directly increases women's perceived stress but has no significant impact on men's perceived stress. However, this same variable increased the anxiety scores in men.

Discussion

The stress process for women and men is similar in the relationships of the indicators to the reported stress outcomes. For example, perceived stress is an important variable for both women and men for the outcomes of depression and anger. However, many differences were also observed, suggesting that the process that leads to stress outcomes for women and men are significantly different. In fact, the effectiveness of the models as predictors varies greatly by gender and the type of stress outcome. The depression and stress models "fit" better for women. The anxiety and anger models "fit" men better.

These differences are highlighted by individual variables that are significant just for women or men. For example, perceived change in the fishing industry tends to increase women's reported depression scores. This finding suggests that women internalize the impacts of industry changes more than men, and the outcome is more likely to lead to a higher depression score for women. However, for men, higher levels of family stress are related to increased anxiety scores, whereas the corresponding relationship is not observed for women. Increased family stress for women tended to increase perceived stress reports.

Industry change impacts women in a direct fashion, even though women are not usually the ones employed in the fishing industry. Previous research suggests that this is because women are concerned about the impacts on the larger family (Aneshensel 1992). Also, the finding that women's perceived stress increases when family stress increases is well known. When depression and stress indicators are used, it seems as if family stress is disproportionately shouldered by women (Aneshensel 1992).

However, the finding that men's reported anxiety levels increase when family stress increases is not part of conventional wisdom, and perhaps especially so for fishermen. In this case, the stressor (family stress) produces disruptive outcomes for both women and men, but the outcomes manifest in different ways. Rarely has such a pattern been displayed so strikingly within the same study group and research paper.

These findings also show that relying on a single stress outcome to measure the impacts of both men and women is probably inadequate. The multiple indicator approach captures dimensions of stress outcomes that might be missed for a specific gender. For example, the Time 1 (pre-net ban) study only contained the depression and perceived stress indices, which as we expected modeled women's stress better than men's.

Conclusions and Implications

This study shows that both husbands and wives involved in commercial inshore net fishing have mental health impacts as a result of changes in the industry and that

these impacts differ by gender. Although the focus of net-ban-related commentary and scholarship has been on the fishermen, our research shows that their wives are also affected by industry changes. This finding is relevant for natural resource policy in that attempts to ascertain the social impacts of regulatory changes by necessity must address the outcomes for wives as well as producers. In fact, Durrenberger (1994) points out that most fishing families are not organized as firms or businesses, but organize their economic structure at the household level. Decisions are not based simply on the profit motive but take into consideration household concerns and the interests of individual family members. Thus, policies and regulations that treat fishing families as economically rational firms are not usually effective, and in fact could be viewed as punitive. In addition, public agency responses that are developed to provide resources and education during a transitional period (i.e., job training) will be inadequate if targeted at only one of the family members. [For similar conclusions about families in the North Atlantic, see Binkley (2000) and Thiessen *et al.* (1992).]

Practitioners who wish to strengthen families' ability to cope and to be resilient in the face of a crisis such as the net ban may want to examine the protective factors outlined in this model. Building the personal resources of self-esteem and mastery would be particularly important. Also, having a new job may help fishermen reduce the anxiety associated with the net ban, possibly because it reinforces their ability to provide for their families.

Practitioners, policymakers, and educators alike should note that, as with the farm crisis (Conger and Elder 1994), although these families may be recovering, the potential for problems related to the net ban appears to have lasted well beyond the actual crisis event itself. The responsibility rests with practitioners and educators to deliver useful programs at the time of the crisis and to systematically follow up in the years thereafter.

Yet this is just the first step in understanding the family and community changes rendered by the net ban. Focusing only on the family unit, on husbands and wives, or on interventions to ameliorate family problems obscures or disregards the fundamental structural causes of the net ban and associated family impacts.

As suggested previously, the net ban referendum in Florida was portrayed to the general public as an environmental issue. However, this depiction clouded the real issue—the reallocation of resources from commercial to recreational uses (Duff and Harrison 1997). The economic realities of such a reallocation for the families in this study were very difficult to cope with. It is unsurprising that there was a great deal of stress and anger related to the contentious political process that brought about the net ban.

As discussed earlier, the public referendum process that recreational groups used to add the net ban to the Florida state constitution portrayed inshore net fishers as destroyers of Florida's fragile marine ecosystem. As a consequence, commercial fishing families had to deal with both the financial burden of resource reallocation and the public perception that they were largely to blame for the decline of Florida's marine environment. Additionally, the net ban circumvented the normal state regulatory process of the fishery. Because the net ban was achieved through a constitutional amendment, there was no opportunity and no mechanism for the state government to critically assess the biological, economic, or cultural impacts of the ban. Referendums such as the net ban deprive participants in the fishery, regulators, and communities opportunities to be involved in resource allocation decisions.

In times past, some coastal villages and communities in Florida were founded and organized around supporting commercial fisherman and the economy of such places was primarily geared toward fishing income. Now, few communities are organized around the commercial industry and even fewer places are heavily dependent on commercial fishing income. Though commercial fishing families are still actively fishing, the communities around them have shifted in orientation. This transformation of communities' economies can be characterized as a transition to other industries, such as services. In many coastal communities, this has included the development and promotion of tourism and recreational fishing. Commercial fishing families had endured these changes, and worked hard to adapt to the many additional regulations up until the net ban. With the net ban, those that remained in commercial fishing had to make a radical shift in the ways that they conducted their business. Their gear was no longer legal, and many local support businesses, such as fish houses, closed. Now, a once vibrant fishing industry is reduced to a dwindling number of families who are no longer a central part of the greater community's economy. Many commercial fishing families have successfully resisted change, but the very communities around them have changed. Now, local communities do not always support commercial fishing, and many actually may hinder seafood production. As such, the net ban has helped hasten the transition of coastal communities so that this once important part of Florida's cultural heritage has been lost.

These issues relate directly to environmental justice, as defined as racial, ethnic, and/or class discrimination in the allocation, use, and protection of natural resources (Perrole 1993). What seems to have been violated in this case, in terms of environmental justice, is the fair and equitable allocation of resources. As outlined in the Principles of Environmental Justice from the 1991 People of Color Leadership Summit, environmental justice includes "the right to participate as equal partners, at every level of decision-making including needs assessment, planning, implementation, enforcement, and evaluation." What evolved in the Florida net ban issue was a class struggle between wealthy recreational fishers and working class commercial fishers. On the whole, the recreational fishers were better organized and funded and, as a consequence, able to exclude commercial fishers from the resource on which they were culturally, socially, and economically dependent (Smith and Jepson 1993). The Florida net ban is a case of environmental injustice.

Unintended Community and Environmental Consequences of the Net Ban

The Florida net ban was passed as a constitutional referendum and made law as a consequence. The dramatic referendum campaign left many unprepared for the aftermath. The net ban forced approximately 1500 fishing families to change expensive fishing gear immediately or leave the industry. To help ease this burden, the state of Florida and the federal government spent at least \$2,000,000 to fund the net buy-back program, about \$1,000,000 in direct assistance, and more than \$10,000,000 in unemployment and job retraining. This is in addition to the approximately \$3,000,000 spent by both sides of the net ban issue (about \$350,000 was spent by the commercial fishers) during the referendum campaign. In spite of these tremendous resources, these programs for the most part failed to meet the needs of many of the families in our study. This was due primarily to a lack of coordination among agencies (although there were the so-called one-stops), and a lack of startup capital for alternative enterprises, such as aquaculture. The fishing families still have significant unmet needs as a result of the net ban. The actual cost

of the net ban to the citizens of Florida, to our knowledge, has never been fully calculated or disclosed, but the amount is very substantial based on what public information we were able to find.

Aside from being very expensive, the net ban may be actually increasing pressure on the marine environment. Prior to the net ban, mullet was the primary targeted species and many other diverse secondary species were also harvested. Our research shows that most fishing families have remained in fishing but now target specific species, such as stone and blue crab, more intensely than in the past. Now some are suggesting that there is a need for increased regulations to protect these intensely targeted species. This will probably refocus or intensify commercial efforts on yet another species as these families struggle to retain their way of life. At this point, it is likely that this pattern will repeat itself numerous times.

Note

1. Multiple correlation linear regression with a small sample size can present severe multicollinearity problems. Careful use of informal diagnostics such as the zero-order correlations and scatter plots of the standardized residuals revealed little impact of the effects of multicollinearity. Further, a formal diagnostic statistic, the variance inflation factor (VIF), was utilized. This statistic indicates how the inclusion of a dependent variable in the model inflates the standard error of the other independent variables. VIFs greater than 10 are generally thought to have undue influence in the Ordinary Least Squares estimation (Lunneborg 1994). In no case were the VIFs in the following analyses equal to 10 or greater.

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